

SUPPORT FOR THE AMENDMENTS

Support for the amendment of Claim 1 is found in Fig. 4 and in the attached declaration by Dr. Takuji Ikeda.

Claim 6 is amended to use wording and structure consistent with U.S. patent law practice.

Support for the amendment of Claim 15 is found on page 30, lines 12-14, in the specification. The claim is further amended to remove description of z as no z is included in the formula.

No new matter is believed added to this application by entry of this amendment.

Upon entry of this amendment, Claims 1-6 and 8-43 are active. Claims 9-14, 22-26 and 34-43 are withdrawn.

REMARKS/ARGUMENTS

The claimed invention provides the crystalline layered compounds described in Claim 1 and claims dependent thereon and the methods of manufacture described in Claims 6 and 15 and the claims dependent thereon, respectively. Applicants respectfully note that Claim 1 is herein amended to include the following description:

a ratio  $Q^3/Q^4$  of the intensity of a resonance in a  $^{29}\text{Si}$ -MAS NMR spectrum at 94 to 107 ppm ( $Q^3$ ) to the intensity of a resonance at 107 to 125 ppm ( $Q^4$ ) is 0.714 or larger

In the attached declaration by Dr. Takuji Ikeda the significance and determination of this ratio is described to indicate the chemical nature of the skeletal structure of the crystalline layered compound. No such crystalline layered compounds are disclosed or suggested by the cited references.

The rejection of Claims 1-8 and 15-21 under 35 U.S.C. 102(b) over Kooli et al. (New Journal of Chemistry, "Novel layered silicate and microporous silica materials in the Na-magadiite-H<sub>2</sub>O-(TMA)<sub>2</sub>O system" New J. Chem., 2001, 25, 1613-1620 [Reference A]) is respectfully traversed.

Kooli describes a microporous silica material described as "FLS" prepared from a system of Na-magadiite, water and tetramethylammonium hydroxide (TMAOH).

The Office continues to allege that "Since the XRD patterns of the prior art and the instant application are exactly the same in peak position and relative intensity, then it must also be true that the composition, bonding nature, and the lattice spacing associated with 2 theta of both materials are the same." (Official Actions dated June 10, 2009, page 5, lines 1-4 and February 4, 2010, page 4, lines 1-5).

Applicants herewith submit a declaration by Dr. Takuji Ikeda, a named inventor in the above-identified application, which shows that the material described in the cited reference is not the material of the present invention and provides spectral comparisons supporting the statement.

In his declaration, Dr. Ikeda compares the material described in the cited reference to the material of the present invention. A related article by Kooli (Reference B: Langmuir, Vol. 18, No. 10, 4103-4110, 2002) wherein the FLS compound is described as FLS1 is also discussed. Dr. Ikeda describes the following differences between PLS-1 and FLS/FLS1, and also CDS-1 and calcined FLS/FLS1:

1) Difference 1: <sup>29</sup>Si MAS-NMR

With regard to the spectra of <sup>29</sup>Si-MASNMR, the spectrum of PLS-1 is different from that of FLS/FLS1.

With regard to the intensities of Q3 spectrum on -94~-107 ppm and Q4 spectrum on -107~-125 ppm, the spectra of PLS-1 and CDS-1 are different from that of FLS/FLS1,

In the case of PLS-1 demonstrated in Fig. 4 of the instant application, the arbitral intensity of Q3 spectrum of the PLS-1 is higher compared with that of FLS/FLS1 (shown by the arrows in Fig.5 in Reference A and Fig.5 in the Reference B), which are evidences showing the amounts of Si-OH on the surface of crystals of these materials are distinctly different.

As shown in Fig. 5d, e in the Reference B, calcined FLS 1 shows a apparent shoulder peak in Q3 region (-94~-107 ppm)(shown by the arrow), which means that the skeleton of FLS1 has a structure, wherein (SiO<sub>4</sub>) Si groups thereof are partially not closed, and has many Si-OH groups present. This shows an essential difference between the skeleton of FLS1 and the skeleton of CDS-1.

The CDS-1 material containing many-OH groups is more hydrophilic in comparison to PLS-1 which contains less-OH groups and is therefore more hydrophobic. This difference in hydrophilic properties clearly shows that PLS-1 as claimed is distinctly different from the material described by Kooli.

Fig.5 in Reference A

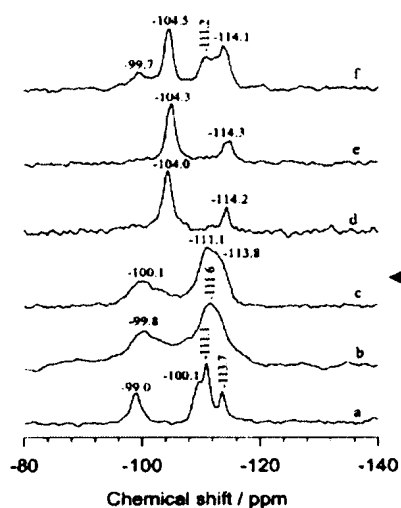


Fig. 5 <sup>29</sup>Si MAS NMR spectra of (a) Na-magadiite and (b-f) resulting phases obtained after reaction at 150 °C for different times. See Fig. 2 for details.

Fig.5 in Reference B

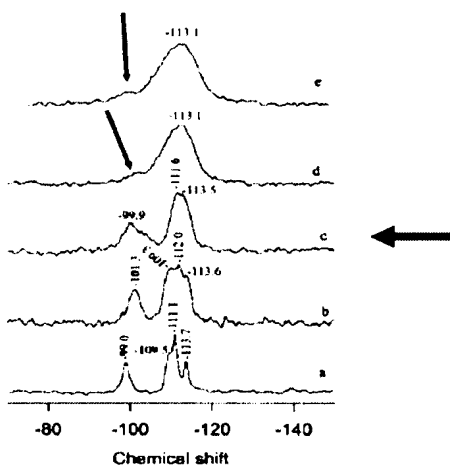
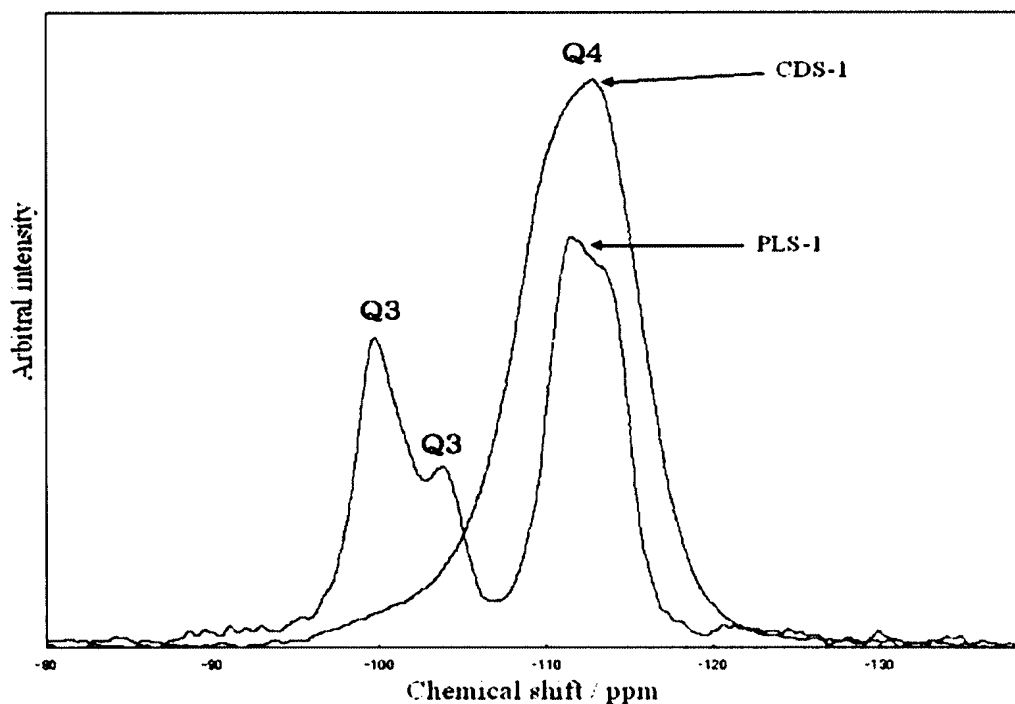


Figure 5. <sup>29</sup>Si MAS NMR of (a) Na-magadiite and (b) H-magadiite. Spectrum c corresponds to the FLS1 phase prepared at 150 °C for 5 days, then calcined at (d) 500 and (e) 700 °C.

<sup>29</sup>Si MAS-NMR spectra of PLS-1 and CDS-1 (Fig.4 in this application)



Dr. Ikeda has compared the relative intensities of the resonances in the two spectral regions ( $Q^3/Q^4$  ratio) which is also described in reference 1 by the inventors and shown that in the reference material the  $Q^3/Q^4$  ratio is significantly lower. Based on this difference, Dr. Ikeda concludes that the material described by Kooli is hydrophilic in comparison to the hydrophobic material according to the invention. Therefore the reference material and the material of the invention cannot be the same.

Applicants respectfully note that as described above, Claim 1 is herein amended to recite a value of the  $Q^3/Q^4$  ratio as 0.714 or higher.

2) Difference 2: Porosity

Dr. Ikeda shows that the average pore size of calcined FLS-1, as analyzed by nitrogen adsorption method is 0.88nm, whereas the average pore size of the CDS-1 is 0.48nm (the first peak) and the second peak shows only 0.64nm, as shown in Fig. 8 in the specification.

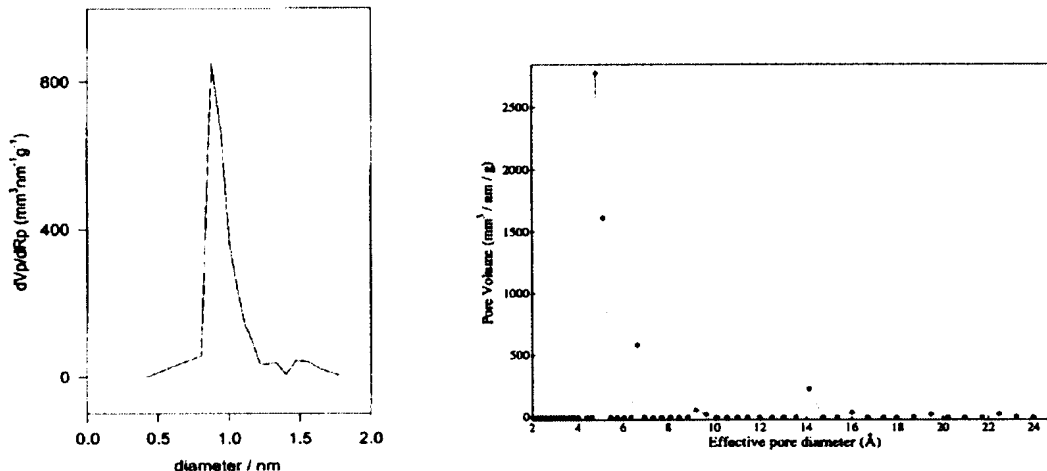


Figure 10. Pore size distribution of FLS1 calcined at 500 °C. using the MP method.

Fig.10 in Reference B      CDS-1 (Fig.8 in this application)

The crystal structure of the CDS-1 is registered as the topology of CDO (CDS-One) by International Zeolite Association (IZA), wherein the maximum pore size of the CDS-1 is described as 0.47nm(Reference: Atlas of Zeolite Framework Types, 6th revised edition, 2007, Ch. Baerlocher, W. M. Meier and D. H. Olson, ISBN: 978-0-444-53064-6).

Further, with regard to the pore volume from nitrogen adsorption isotherms, the pore volume of the CDS-1 is calculated to be 0.6ml/g (Reference ), but the pore volume of the calcined FLS1 is  $\leq 0.317$ ml/g as demonstrated in Table 1 in Reference B.

**Table 1. Surface Areas of FLS1 Calcined at Different Temperatures Calculated Using the BET Equation<sup>a</sup>**

sample	$S_{\text{BET}}$ ( $\text{m}^2 \text{g}^{-1}$ )	$C_{\text{BET}}$	corr coef	pore vol <sup>c</sup>
H-magadiite	40	137	0.999 98	
FLS1	90	128	0.999 85	0.141
FLS1(300) <sup>b</sup>	120	-316	0.999 46	0.114
FLS1(400)	306	-189	0.999 39	0.212
FLS1(500)	436	-180	0.999 68	0.317
FLS1(700)	307	-106	0.999 55	0.205
FLS1(800)	270	-134	0.999 58	0.181
FLS1(900)	95	282	0.999 88	0.115

<sup>a</sup> The corresponding CBET and correlation coefficients are also reported. <sup>b</sup> Values in parentheses indicate the calcination temperatures (°C). <sup>c</sup> mL (liquid nitrogen) g<sup>-1</sup>.

Table 1 in Reference B

Therefore, as Dr. Ikeda describes, PLS-1 is different from FLS/FLS 1, and CDS-1 is different from the calcined FLS/FLS1.

In view of all the above, Applicants respectfully submit that the reference does not describe the claimed invention and therefore cannot anticipate the claimed invention. Applicants respectfully request that the rejection of Claims 1-8 and 15-21 under 35 U.S.C. 102(b) over Kooli et al. (New Journal of Chemistry, "Novel layered silicate and microporous silica materials in the Na-magadiite-H<sub>2</sub>O-(TMA)<sub>2</sub>O system" New J. Chem., 2001, 25, 1613-1620 [Reference A]) be withdrawn.

The rejection of Claims 27-33 under 35 U.S.C. 103(a) over Kooli in view of Deckman et al. (U.S. 7,049,259) is respectfully traversed.

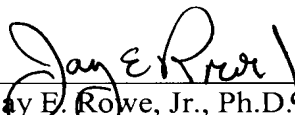
Applicants have described above that the primary reference does not disclose or suggest the PLS or CDS-1 materials of the claimed invention. Deckman is cited to show incorporation of zeolites into an inorganic membrane supported by porous glass, sintered steel,  $\alpha$ -alumina and other inorganic oxides. (Official Action dated June 10, 2009, page 9, lines 10-13)

Deckman describes a method to prepare a structure of layers of molecular sieve material on a porous or non-porous support. This secondary reference does not disclose or suggest the PLS and CDS-1 materials according to the claimed invention and therefore does not cure the basic deficiency of the primary reference. Accordingly, the cited reference combination cannot render the invention according to Claims 27-33 obvious and Applicants respectfully request that the rejection of Claims 27-33 under 35 U.S.C. 103(a) over Kooli in view of Deckman be withdrawn.

Applicants respectfully submit that the above-identified application is now in condition for allowance and early notice of such action is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, L.L.P.  
Norman F. Oblon

  
\_\_\_\_\_  
Jay E. Rowe, Jr., Ph.D.  
Registration No. 58,948

Customer Number  
**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 07/09)